New York State
Intermediate-Level Science Test Sampler
Part D, Sample Performance Test
Administration Arrangements

Note: The arrangements that follow assume that the three sampler stations will be administered during a single testing period of about one hour. If this is not the case, arrangements should be modified accordingly. All three stations can be administered to eighth-grade students as preparation for the performance test they will take in May. The stations can also be used individually by teachers in grades 5–8 when the content has been covered.

To be done several days before the sampler test date:

1 Notify school administrator(s) that you will be administering the ILS performance sampler, Part D. Notify other appropriate professionals and support staff of any role that they may need to play.

2 Select and reserve a testing room that will need to be dedicated for about three hours to set up, one hour per class to administer the sampler, and half an hour to disassemble. It usually takes longer to set up the test materials the first time the sampler is administered.

3 Planning the layout of the testing room is a critical step in the process of performance testing. The testing room must have flattop student work spaces (student tables, lab tables, library tables, or cafeteria tables) in sufficient numbers for the number of students to be tested. An individual student desk may be too small to accommodate all the equipment for a station plus provide room for the student to write. It may be possible to place two smaller individual desks together to make a larger work area for one station. Determine how many tables will be needed and how they will be arranged in groups of three stations each. (See next page.) Some schools will need a room large enough to accommodate 8–12 groups (24–36 students) comfortably. Students will need to rotate (either sideways or front to back) among stations within their group with as little confusion as possible. An important consideration is the location of Station Z, which requires the use of a microscope. If the microscope uses a mirror, it should be positioned so it has enough light, but not direct sunlight. If it has an electrical light source, it must be positioned near an electrical outlet.

4 A single master copy of all print materials has been provided by SED. These will include a student test booklet, administration arrangements, and a rating guide.

5 School personnel may create the equipment needed for each station or purchase the equipment from a vendor. If a vendor is used, schools will still need to provide two major items from their inventories in quantities that will supply the necessary number of stations: triple-beam balances and compound microscopes with both low- and high-power objectives. Check to be sure all balances are "zeroed" and the microscopes are in good working order. The microscopes should have an eyepiece with a magnification of 10x, a low-power objective with a magnification of 10x, and a high-power objective with a magnification of about 40x. Overall, the microscopes should provide total magnifications of 100x and about 400x.

6 Check all equipment and print materials to be sure that there is enough to accommodate the maximum number of students to be assessed at one time. Each group will handle three students simultaneously and students will move to each station within their group. If a maximum of 30 students are to be assessed at one time, you will need 10 groups and equipment for 10 complete setups of each station. One test booklet and a pencil are needed for each student.

7 Make enough copies of the Station Diagrams to place one at each station. Master Station Diagrams can be found in Appendix A.

8 Set up each station according to the directions provided on pages 31–35. The materials listed are required for a single station. These must be multiplied by the number of groups needed for the class size to be tested.

9 Complete the Test Administrator's Record Sheet for the soaps at Station Y. A master copy of this sheet can be found in Appendix A.

10 Two adult test administrators (two professionals, or one professional and one paraprofessional, who have been trained and are totally familiar with the test protocols and the equipment) should be in the room to be available to direct student movement and handle equipment issues. In addition, there may be need for a teacher or aide to be assigned to a student with an IEP assessment alternative. Adults assigned to assist students with IEPs should receive training regarding the procedures used in this assessment. To minimize possible distractions during the testing, other adults should not be invited to attend.

To be done on the sampler test date or the day prior:

1 Arrange the tables in groups. Place all the equipment needed for a station at the appropriate table location with its copy of the Station Diagram. Remember that natural or artificial lighting is needed for the microscopes, so locate all the Station Z setups first. The stations do not need to be in numerical order within a group. Return to each table and arrange the equipment exactly as it is shown on the Station Diagram.

2 Prepare a diagram of the room layout of the stations. Assign a group number to each group of Stations X, Y, and Z. Use this group numbering system to tell students which group they are in. The group number will be recorded on the cover of the students' test booklets. This number will be the same as the number on Soap A and Soap B at Station Y.

3 Check that the data for Soaps A and B has been recorded on the Test Administrator's Record Sheet.

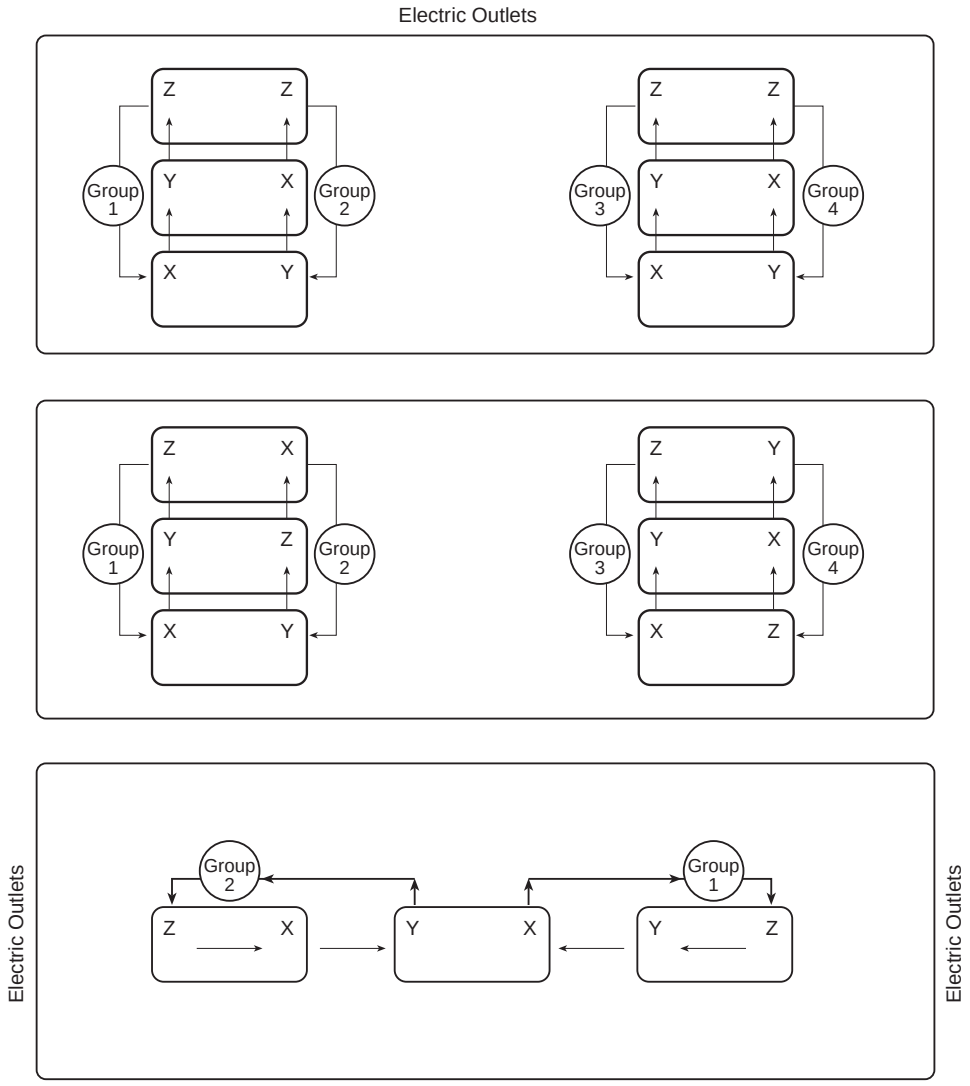
4 Just before students enter the room, place a sharpened pencil and one copy of the student test booklet at each station. Have a supply of extra sharpened pencils available.

5 Write the school name on the chalkboard so students can correctly and quickly record it in their test booklets.

6 Students should have the opportunity to visit the rest rooms prior to the testing session.

7 Reserve a location near the door for the placement of items that students may bring with them to the test room, such as books, bookbags, or coats.

Partial Diagrams of Typical Classroom Setups
Three Typical Group Setups



Station X: Experimenting with a Ball and Ramp

Task Description:
Students will complete a data table about how far a golf ball moves a cup when the ball is released from different heights on a ramp. Students will then identify some variables that will affect how far the cup moves. They will then design an experiment and formulate a hypothesis.

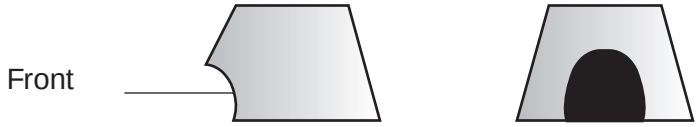
Time: 15 minutes

Materials for one station:

Ruler with groove	Round transparent plastic container with hole
Support block(s)	Place mat with measuring strip
Golf ball	Masking tape
Duct tape or carpet tape	5-g mass or 25-cent coin

Preparation (to be done prior to the test date):

1 The transparent plastic cup is about 12 cm in diameter, about 1 pint in size, and about 15 g in mass, e.g., a deli container. From the rim, cut a hole (about 6 cm x 6 cm) to allow enough room for the golf ball to roll inside.



2 The grooved plastic ruler serves as the ramp for rolling the balls. On the ruler, allow only the metric units to show. Cover the standard units (inches) with black permanent marker, masking tape, or duct tape. Be sure the tape does not get into the groove of the ruler, as it may interfere with the roll of the ball. The ruler's zero mark should be at the end of the ruler, not indented.

3 A place mat on an 11" x 17" sheet of paper (preferably laminated) will be needed. A template that can be enlarged is provided in Appendix A.

4 A block of wood about 5–6 cm in height will serve as a ramp support.

5 Assemble the ramp setup as described below, but do not tape any equipment down until everything has been put in place and tested so the ball does not push the cup off the table.

6 Use masking tape to secure the Station Diagram in the lower left corner of the desk.

7 Place the ruler's 28–29-cm mark at the edge of the ramp support and the ruler's zero mark on the table. Slip the place mat under the ruler so that it is aligned with the "End of Ramp" mark (about 1 cm inside the edge of the place mat).

8 Place the ramp support to the back and far left of a level desk/table so that the ruler will slope down from upper left to lower right. The ruler's numbers must be close to the student's side of the desk (even if the numbers are upside down). If the numbers are not closer to the student's side, reverse the ramp position to the back and right of the desk/table. (Note: If this is the case, the Station Diagram will not exactly match the setup.) Place the ramp back far enough on the desk/table so that the student has plenty of room to write.

9 Place the cup on the place mat's "Starting Circle" 1 cm away from the end of the ruler with the cup's opening toward the ruler.

10 Place a 5-g mass or a 25-cent coin on the top of the cup and secure it in two directions with masking tape. Try rolling the golf ball from the 28–29-cm mark. The cup should slide and stop beyond the15-cm mark on the place mat. Release the ball from the 10-cm and 25-cm marks to be sure to have a good range of values for the distance that the cup slides. (If the ramp is too steep, the ball will bounce down the ramp and on the table giving inconsistent results.)

11 Once you have determined the correct height of the ramp, tape down the corners of the place mat. Then tape the base of the support block(s) to the table. Use double-sided carpet tape to secure the bottom of the block. If using duct tape (or

masking tape), secure strips of tape against the sides of the block. Do this on all four sides of the block. (If the block should slip during set up, reset the block by using the ruler as a guide to the place mat.) Place carpet tape on the underside of the ruler at the zero and the 29-cm marks to secure the ruler. (Duct tape or masking tape that has been rolled back on itself so there are two sticky sides can also be used.) When the ruler is put into place, it should have the zero mark on the place mat and the support at the 28–29-cm mark. Place two additional strips of tape across the ruler, at the 29-cm mark, following the ruler's contour, and secure it to the support. If the tape is too tight, this will lift the other end of the ruler off the place mat. (If the block is held in place by carpet tape, the tape can remain permanently stuck to the bottom of the block. Save the paper strips that come with the tape and resecure the strips over the tape. This will make it easier to set up the tasks in the future.)

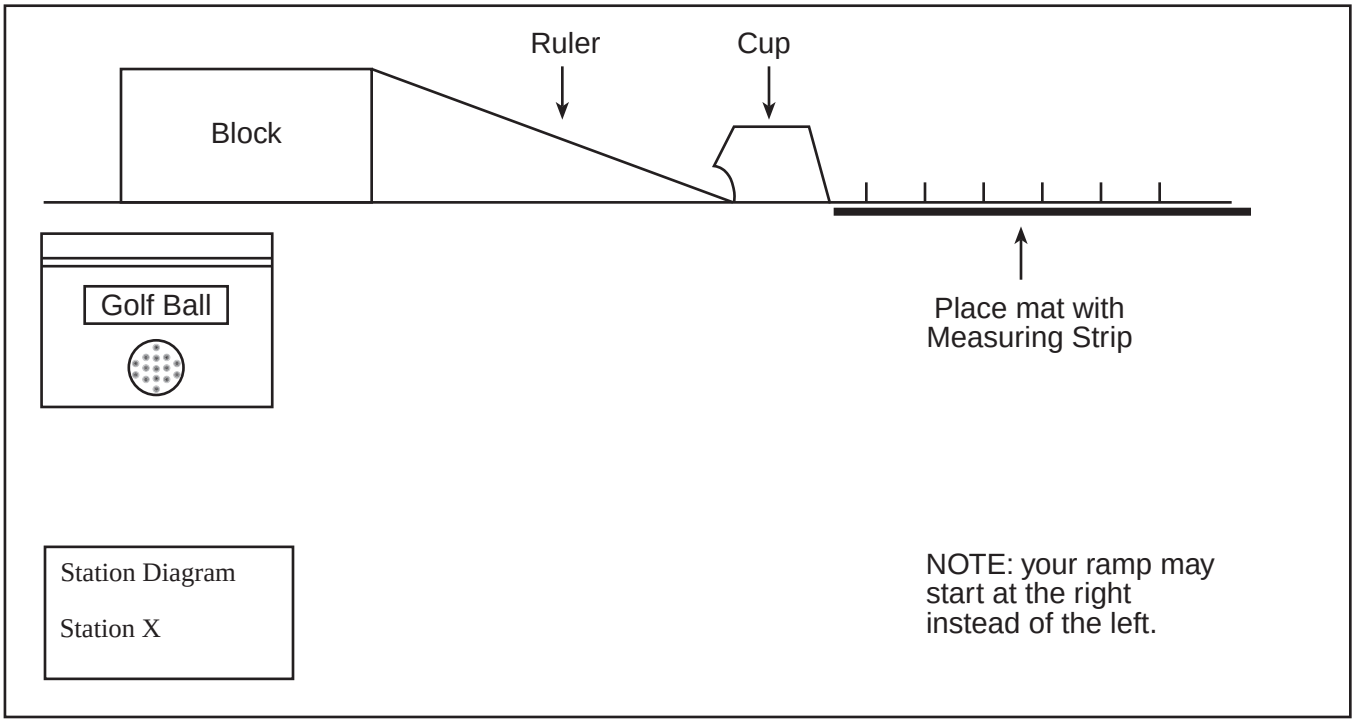
12 Release the golf ball from the 29-cm mark to be sure that the whole system is working correctly and the cup is not pushed off the table. NOTE: As the place mat is used a number of times, the surface may become smoother, so the cup's sliding distance may increase over time.

13 Place the golf ball in a transparent, resealable bag that is labeled "Golf Ball."

14 Place the equipment at the station so its location agrees with the Station Diagram.

NOTE: Full-page master copies of the Station Diagrams can be found in Appendix A.

Station Diagram
Station X: Experimenting with a Ball and Ramp



Station Y: Soaps and Water

Task Description:
Students will determine the mass, volume, and density of two soap samples and predict how they would behave if they were placed in water. Students will then place two balls in a cup of water and compare the densities of the balls.

Time: 15 minutes

Materials for one station:

- Balance (triple-beam)
- Ruler (metric)
- Calculator
- Soap A (Neutrogena)
- Soap B (Ivory)
- Water
- Permanent marking pen
- Rubber or composition ball that floats
- Styrofoam ball
- Paper towel
- 3 small resealable, lightweight plastic bags
- Plastic transparent cup (about 9 oz)
- Masking or duct tape

Preparation (to be done prior to the test date):

1 The triple-beam balance must be mechanical and measure to the nearest 0.1 g. Do not use electronic balances.

2 The ruler must have only metric units showing. All other units must be covered with tape or marked over with permanent marker. The zero mark should be at the end of the ruler, not indented.

3 The rubber or composition ball and Styrofoam ball should both be about 2.5 cm (1") in diameter so they are visually the same size. Both balls should float at different levels. Place both balls in the same small transparent resealable plastic bag.

4 The small plastic transparent cup should be large enough for both balls to be in the cup at the same time but not so large that either soap sample will fit into it. Write "WATER" on the side of the cup and add water to about the 1/2 level.

5 Soap A must have well-defined corners and edges (e.g., Neutrogena). Remove its plastic wrapper.

6 Soap B must have a density less than 1.0 g/cm^3 (e.g., Ivory). With a knife, carve away any name references on each side. Then, make a diagonal cut across the soap so that roughly two equal triangular pieces result. Carve away the middle section of each piece to make two irregularly shaped pieces, one for each of two stations. Smooth away any square edges and loose material. The soaps should be replaced every few years, as they will lose mass and size.

7 Take two small, clear light weight resealable plastic bags. With permanent marking pen, write "Do Not Open" at the top of both bags. Then, on one bag, write "Soap A" and on the other write "Soap B." Place the Neutrogena-type soap in Soap A bag, and the 1/2 piece of Ivory-type soap in Soap B bag. Seal bags with masking tape or staple, so that they cannot be opened.

8 Add a group number to each Soap A sample so that the bags for the samples now read Soap A-1, Soap A-2, Soap A-3, etc. Repeat this procedure with the Soap B samples. Prepare enough samples so that there is a set for each group that you identified in the diagram of the room layout (see page 30). Soap A-1 and Soap B-1 will be placed at Station B for Group 1, Soap A-2 and Soap B-2 will be placed at Station B for Group 2, etc.

9 Measure the length, width, and height of one of the Soap A samples. Note this information on the Test Administrator's Record Sheet (Appendix B). Calculate the volume of the soap based on these dimensions. These values, with the range of variation noted, will be used in rating students' responses to this station.

10 Use masking tape to secure the Station Diagram in the lower left corner of the desk.

11 Place the equipment at the station so its location agrees with the Station Diagram.

12 Measure and record the masses for the soap samples on the chart provided in the Test Administrator's Record Sheet (Appendix B). Once the stations have been set up, complete the record sheet. Use the gram balance at the station where

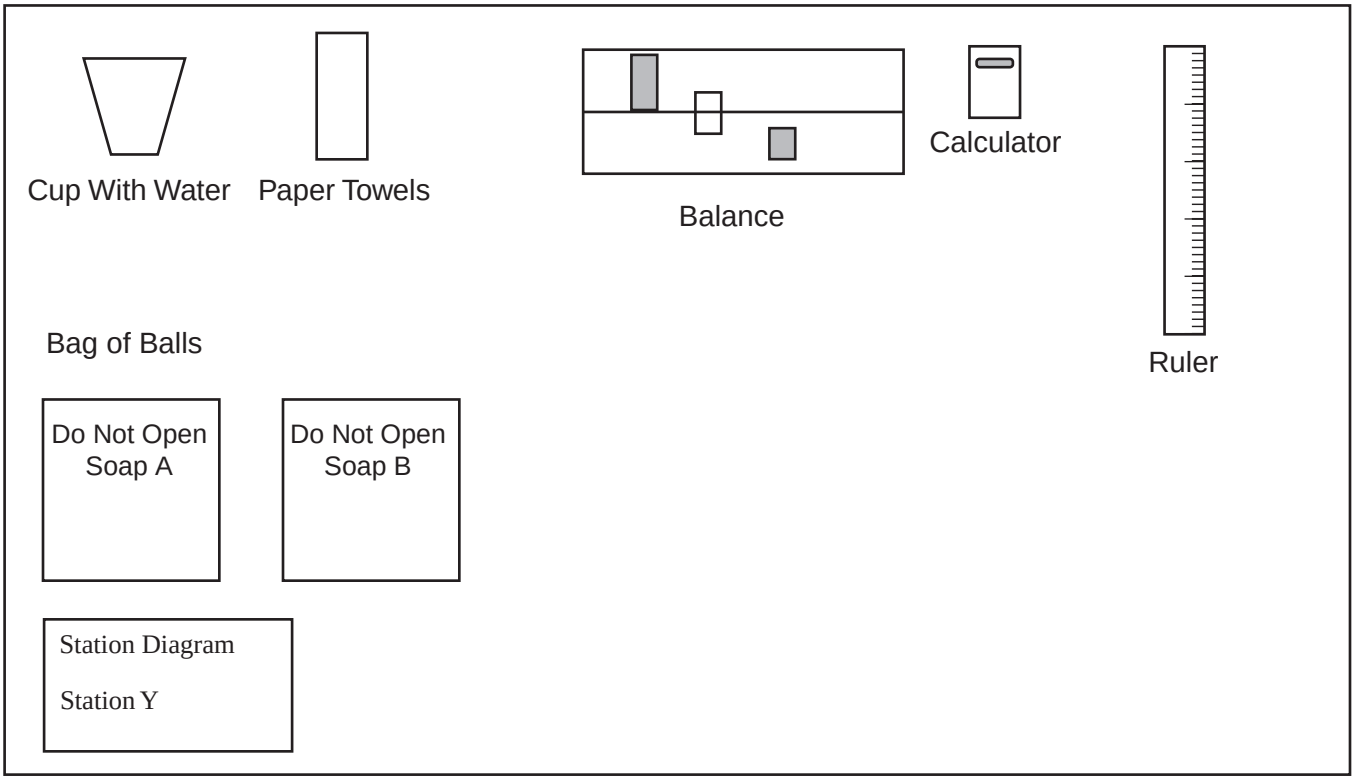
the soap samples have been placed. Complete the "Acceptable Range" column for each soap sample, based on the mass. These ranges will be used in rating students' responses to this station.

Modifications: Any triple-beam balance the students are familiar with is acceptable as long as it is mechanical and measures to the nearest 0.1 g.

Safety: The balls should be dry before storing to prevent the growth of molds. Leave the plastic bags with the balls in them open during storage.

NOTE: Full-page master copies of the Station Diagrams can be found in Appendix A.

Station Diagram
Station Y: Soaps and Water



Station Z: Cell Size

Task Description:
Students will measure the size of a microscope's field of view and estimate the size of a cell in a prepared slide. Students will then draw accurate sketches of different cells that they observe under the lowest power (about 100x) and the highest power (about 400x).

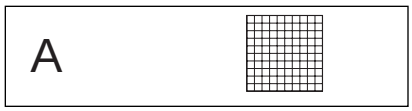
Time: 15 minutes

Materials for one station:

1-mm graph paper
Blank slide
Transparent tape
3" x 5" index cards
Compound microscope with a low-power lens (about 100x total magnification) and high-power lens (about 400x total magnification)
Prepared stained slide of onion cells (allium leaf epidermis) (at least 3 mm x 3 mm)
Prepared stained slide of animal tissue (such as frog skin or frog blood) (at least 3 mm x 3 mm)

Preparation (to be done prior to the test date):

1 Prepare a permanent slide of a section of graph paper ruled every 1 mm. Cut out a 2 cm x 2 cm section of the graph paper. Use the transparent tape to mount the graph paper section in the center of the blank slide. Label this Slide A.



2 Prepare a wet mount slide of stained onion skin, or purchase a prepared slide of allium leaf epidermis. Be sure the sample is much larger than the field of view under low power (at least 3 mm x 3 mm). Label this Slide B.

3 Prepare or purchase a slide of stained animal tissue such as frog skin or frog blood cells. Label this Slide C.

4 The compound microscope should have only two objectives, about 10x and about 40x. Combined with a 10x eyepiece, these will provide total magnification of about 100x and about 400x. If the microscope has additional objectives, cover them securely with lens paper so the objective cannot be used.

5 When setting up the room, locate this station first for each group. This is important because the microscopes may need an electrical outlet for the light source or good natural lighting if mirrors are used. Do not place the microscopes where direct sunlight could hit the mirror and reflect into students' eyes.

6 Use masking tape to secure the Station Diagram in the lower left corner of the desk/table.

7 Place the equipment at the station so its location agrees with the Station Diagram.

Safety:

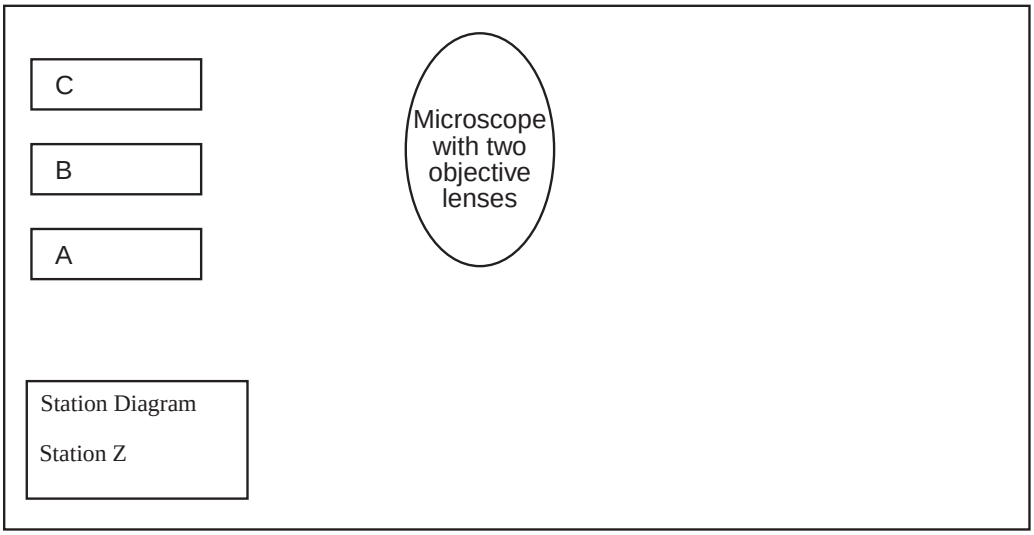
1 When positioning microscopes, check their placement carefully. Do not place the microscopes where direct sunlight could hit the mirror at any time during the testing period.

2 Alert students to sharp edges of microscope slides.

3 Monitor the students for safe use of the microscopes.

NOTE: Full-page master copies of the Station Diagrams can be found in Appendix A.

Station Diagram
Station Z: Cell Size



Directions for Administration of Performance Test Sampler

Note: These directions assume that all three sampler stations will be administered during one testing period. If this is not the case, the directions will need to be modified accordingly.

1 This performance test is a timed test. Students should be provided the opportunity to visit the rest rooms prior to coming to the exam room so that an unscheduled interruption does not occur during the testing period.

2 Teachers should tell students not to bring bookbags, coats, books, or such items to the testing room. These items will get in the way when students rotate among stations. If these items are brought to the test room, they should be left in a designated area near the door.

3 Quickly bring students into the testing room, first filling those stations farthest from the door. It does not matter which station they go to first because each student will eventually be doing all tasks. Instruct students not to touch the equipment and **not** to open the test booklet until they are instructed to do so.

4 Do not attempt to explain to students at the beginning of the test how to move among stations within their group. Reserve that information for after the completion of the first task, and then again after the second.

5 If students have questions during the test, you may give assistance for lost or broken equipment or safety issues. However, most student questions should only be answered with "Read it again," "Sound out the word(s)," or "Do your best," etc.

6 You must not give assistance to students on how to do a procedure or acknowledge that the student is doing the correct or the incorrect procedure. This is not the time to be providing instruction. The purpose of this diagnostic test is to determine what the student is able to do. Exceptions to this would be safety concerns or specific provisions in a student's IEP for allowable testing alternatives.

7 A timing device, stopwatch, or clock with a sweep-second hand must be used to provide accurate time splits of 10 minutes, 13 minutes, and 15 minutes. If using a clock with a sweep-second hand, the start time and splits should be noted on a piece of paper, the chalkboard, or the Test Administrator's Record Sheet. See the chart on page 38 as an example.

8 Be sure to collect a test booklet and pencil from each student before the students leave the testing room.

9 Students will be anxious to get started; therefore, when students are at their first station and ready to work, quickly read aloud to the students the scripts that are in the boxes that follow. (Italicized information in parentheses or information that is outside the boxes is information for you and your colleagues and is not to be read aloud.)

Detailed Directions to be Read to Students Who are Taking the ILS Performance Test Sampler

When students are at their first station and ready to work, read the following information to them. This direction-reading stage is not to be counted as part of the time for completing the first task.

Good morning (afternoon). Today, you will be working on some tasks that require science skills. I think you will enjoy these tasks because you will be able to use science equipment to help you answer the questions. Please listen carefully, follow my directions and the directions in your test booklet, and do your best work.

If you do not have a test booklet or pencil at your station, raise your hand. (short pause)

Print your name on the cover of your test booklet and put a check mark to indicate if you are male or female. (pause) Write in the name of our school as I have it written on the chalkboard. (pause) Write your group number. I will tell you which group you are in. (Assign a number to the students in each group.)

Keep this test booklet and pencil with you throughout the test. They will be collected at the end of the test.

Look at the cover of your test booklet. Let's read the test directions together. You read along silently while I read aloud.

"This test booklet contains science performance tasks located at three different stations, X, Y, and Z. During this skills test, you will visit all three stations and do some different things at each station. You are already seated at one of these stations. Use the materials at the station to help you do the tasks."

"At each station you will have 15 minutes to finish your work. Continue working until you see the word "**STOP"** at the bottom of the page or until the 15 minutes are up. If you have extra time, check your work, or wait quietly."

"Do not help other students or ask others to help you. Everyone should work alone. There must be no talking between students during this test."

"Read the directions for each station carefully. All of your answers must be recorded in this test booklet."

"After you complete the tasks at each station, please leave the station the way it is shown on the Station Diagram." This diagram is located in the lower left corner of your station.

Do **not** try to explain at this time how the students will be moving from station to station. Leave that information until after the completion of the first task (and then again after the second task is completed).

The directions that follow will be repeated three times during the testing session.

Look at the bottom left corner of your desk/table. The Station Diagram gives the letter and title of the station you will be doing. Open your test booklet and find that station.

Demonstrate and pause for students to complete. Look around to be sure that everyone has found the correct place.

Look at the Station Diagram again. Check to see that you have all the equipment that is shown on the diagram and that the equipment is located where it should be. If anyone is missing equipment, raise your hand. (pause)

Resolve equipment problems if necessary.

You may begin work. *(Begin timing the 15 minutes now.)*

Start a stopwatch or note the time on a clock with a sweep-second hand. Record the time on the chalkboard or on a sheet of paper. A sample chart for keeping the time is shown below.

Time	Say:	First Station	Second Station	Third Station
Start Time	"You may begin work."			
Start Time + 10 min	"You have 5 minutes left."			
Start Time + 13 min	"You have 2 minutes left."			
Start Time + 15 min	"Stop working."			

Remember that the test administrator can only provide limited assistance to the students. If students have questions during the test, you may give assistance only for lost or broken equipment or safety issues. However, most student questions should only be answered with "Read it again," "Sound out the word(s)," or "Do your best," etc.

You must not give assistance to students on how to do a procedure or acknowledge that the student is doing the correct or incorrect procedure. The purpose of this diagnostic test is to determine what the student is able to do without the teacher's assistance or instruction. Exceptions to this would be safety concerns or specific provisions in a student's IEP for allowable testing alternatives.

After 10 minutes, say:

> You have 5 minutes left.

After 13 minutes, say:

> You have 2 minutes left.

After 15 minutes, say:

> Stop work. Please put all the equipment back the way it is shown on the Station Diagram. Put microscopes back to the lowest power, and the balances back to zero, and clear the calculations. (pause)

Before the students move to the next station, check to be sure all equipment and material is positioned as shown in the Station Diagram.

> We are now going to move to your next station. I will show you how it is done. Be sure to take your test booklet and pencil with you.

Because stations have been arranged in groups, student movement can be kept to a minimum. It is recommended that the test administrator take one group and demonstrate for the whole class how students will move to the next station. Then, let each group move one at a time and provide help when necessary. When the movement to the next station is completed, repeat the directions starting at the top of page 37 until the testing session is completed.

When the students have completed **all three stations**, say:

> The science skills test is over. Thank you for being so attentive and cooperative during the test. Please wait quietly until you are dismissed.

Be sure to collect a test booklet and pencil from each student before the students leave the room.

You may conduct a class interview about the test if you wish. This may help you determine areas in which students had difficulty.

Raw Scores			
Station X	Station Y	Station Z	Total
(max = 10)	(max = 18)	(max = 12)	(max = 40)

New York State
Intermediate Level Science Test Sampler
Part D, Sample Performance Test
Student Test Booklet

Name _____ Sex ❒ Male ❒ Female

School _____ Group # _____

This booklet contains science performance tasks located at three different stations, X, Y, and Z. During this skills test, you will visit all three stations and do some different things at each station. You are already seated at one of these stations. Use the materials at the station to help you do the tasks.

At each station you will have 15 minutes to finish your work. Continue working until you see the word **"STOP"** at the bottom of the page or until the 15 minutes are up. If you have extra time, check your work, or wait quietly.

Do not help other students or ask others to help you. Everyone should work alone. There must be no talking between students during this test.

Read the directions for each station carefully. All of your answers must be recorded in this test booklet.

After you complete the tasks at each station, please leave the station the way it is shown on the Station Diagram. This diagram is located in the lower left corner of this station.

STOP

Do **not** go on to the next page until you are instructed to do so.

Station X: Experimenting with a Ball and Ramp

TASK:
At this station, you will observe a ball rolling down a ramp and moving a plastic cup. You will then identify some variables that would affect how far the cup moves. Finally, you will design an experiment and formulate a hypothesis.

***** DO NOT MOVE THE RAMP SETUP *****

DIRECTIONS:

1 Be sure the cup is on the Starting Circle, with the opening in the cup facing the end of the ruler, at the start of each trial.

2 Take the golf ball out of the bag.

3 Place the ball on the ramp (ruler) so the middle of the ball is at the 15.0-cm mark on the ruler. Without pushing the ball, carefully release it so the ball goes into the cup. Note the distance the cup moves.

4 On data table 1 below, record the distance the cup moves when the ball is released from the 15.0-cm mark. Record the distance to the nearest 0.1 cm.

Data Table 1

Ball's Release Point (cm)	Mass of Cup (g)	Distance Cup Moved (cm)
15.0	16.0	
20.0	16.0	
25.0	16.0	
25.0	16.0	
25.0	16.0	

5 With the cup returned to the Starting Circle, release the golf ball from the 20.0-cm mark on the ruler. Record the distance the cup moves to the nearest 0.1 cm in data table 1.

6 With the cup returned to the Starting Circle, release the golf ball from the 25.0-cm mark on the ruler. Record the distance the cup moves to the nearest 0.1 cm in data table 1.

7 With the cup returned to the Starting Circle each time, release the golf ball two more times from the 25.0-cm mark on the ruler. Each time, record the distance the cup moves to the nearest 0.1 cm in data table 1.

8 You probably found that the cup traveled slightly different distances when you released the ball three times from the 25.0-cm mark. Give two reasons that might explain why the cup did <u>not</u> stop at the <u>exact</u> same spot each time.

First Reason: _____

_____

Second Reason: _____

_____

9 Think about how you might design a new experiment. In this experiment you want to study how changing the mass of the cup will change the distance it is moved by the golf ball. Assume that the equipment setup for this new experiment will be the same as what is now at your station. The data table for this new experiment is shown below. **(Do <u>not</u> actually fill in data table 2.)**

Data Table 2

Ball's Release Point (cm)	Mass of Cup (g)	Distance Cup Moved (cm)
	20.0	
	40.0	
	60.0	
	80.0	

10 What would you recommend about the release point of the golf ball each time a new cup is tested?

_____

_____

_____

11 Write a hypothesis about the distance the cups of different masses will be moved by the golf ball.

_____

_____

_____

_____

12 Return all materials to their positions as shown on the Station Diagram.

STOP

Station Y: Soaps and Water

TASK:
At this station, you will determine some properties of two soap samples and predict how they would behave if they were placed in water. You will then place two objects in water and compare their densities.

DIRECTIONS:

1 To protect the soap samples, do NOT take them out of the plastic bags and do NOT place the soaps in water. Disregard the effect of the plastic bags for all measurements and calculations.

2 What is the number on the bag for Soap A? ____

What is the number on the bag for Soap B? ____

3 Use the data table below to record your answers to questions 4–7.

Some Properties of Two Soap Samples

Soap	Mass (g)	Volume (cm^3)	Density (g/cm^3)
A			
B			**0.8**

4 Measure the mass of Soap A and measure the mass of Soap B. Record the values to the nearest 0.1 g for each in the data table above. (Note that the unit, g (grams), has been provided.)

5 Measure the length, width, and height of Soap A to the nearest 0.1 cm. Record these dimensions in the work space below. Substitute your values in the formula provided. Then use the calculator to determine the volume of Soap A. Show your work in the space below. Record your value to the nearest 0.1 cm^3 in the data table.

Work Space

Length _____ cm Width _____ cm Height _____ cm

Volume = Length Width Height

6 For Soap A, substitute your values for mass and volume in the formula provided. Then use the calculator to determine the density of Soap A. Show your work in the space below. Record your value to the nearest 0.1 g/cm^3 in the data table.

Work Space

$$\text{Density} = \frac{\text{Mass}}{\text{Volume}}$$

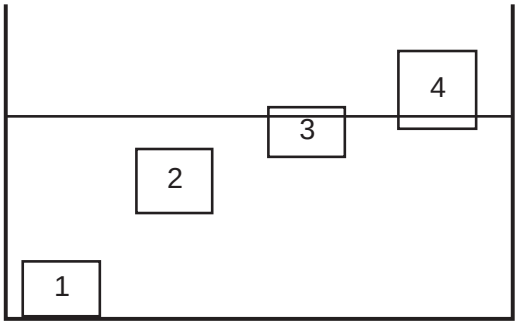
7 Notice that the density of Soap B has been provided in the data table (0.8 g/cm^3). For Soap B, substitute your values for mass and density in the formula provided. Then use the calculator to determine the volume of Soap B. Show your work in the space below. Record your value to the nearest 0.1 cm^3 in the data table on page 42.

Work Space

$$\text{Density} = \frac{\text{Mass}}{\text{Volume}}$$

8 The diagram below represents a glass container with water. Think about what would happen if Soap A and Soap B were removed from the plastic bags and placed in this container. **Remember, do <u>not</u> actually put the soaps in the water.**

Container of Water



Water Density=1.0 g/cm^3

Base your answers to questions 9 and 10 on the values in your data table on page 42. (Circle one answer for each question.)

9 Which block in the diagram above shows about where Soap A would be if it were placed in the container of water?

(Circle one) Block 1 Block 2 Block 3 Block 4

10 Which block in the diagram above shows about where Soap B would be if it were placed in the container of water?

(Circle one) Block 1 Block 2 Block 3 Block 4

---

11 Take the rubber ball and the Styrofoam ball out of the bag. Place them in the plastic cup with water. Observe the position of the balls in the water. Based on your observations, how does the density of the rubber ball compare with the density of the Styrofoam ball? Explain your answer.

_____

_____

_____

_____

_____

12 Remove the balls from the cup, wipe them off, and return them to the bag.

13 Return all materials to their positions as shown on the Station Diagram.

STOP

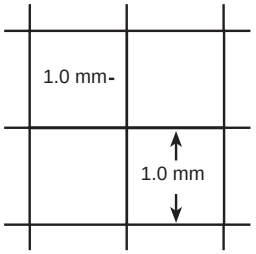
Station Z: Cell Size

TASK:
At this station you will measure the size of a microscope's field of view, estimate the size of a cell, and draw pictures of cells that you observe under the lowest and highest powers.

DIRECTIONS:

1 Pick up Slide A, hold it up to the light, and look at the squares.

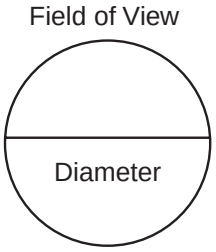
2 Slide A is a prepared slide of a tiny piece of graph paper. The lines of the graph paper are all spaced 1.0 mm apart.



Graph Paper on Slide A
(Not to scale)

3 Place Slide A on the microscope stage and bring the graph paper into focus, using the lowest power.

4 When you look into the microscope, the whole area you see is called the "field of view." Knowing that the lines of the graph paper are 1.0 mm apart, estimate the diameter of the lowest power's field of view to the nearest 0.25 mm.

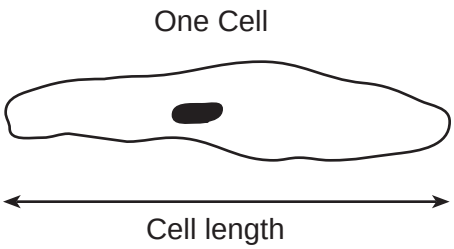


(Not to scale)

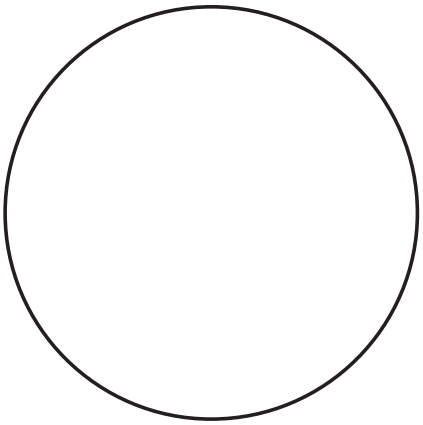
Estimated diameter of the lowest power's field of view: _____ mm

5 Return Slide A.

6 Place Slide B on the microscope and bring it into focus under the lowest power. Slide B is a piece of onion skin tissue that has been stained and mounted for viewing. See the diagram below for a sketch of what one cell might look like. The cell length has been labeled.



7 Look closely at Slide B under the lowest power. Find one row of cells that goes across the middle of the field of view from one edge of the field of view to the other edge. These cells may go from side to side, from top to bottom, or diagonally across the diameter. In the circle at the right, carefully sketch only <u>one row</u> of cells whose lengths go across the field of view.



One Row of Cells Under Lowest Power

8 How many cells did you see under lowest power in the row that you drew above? _____ cells

9 In Step 4 on the previous page, you estimated the diameter of the lowest power's field of view. Record that value again here: _____ mm

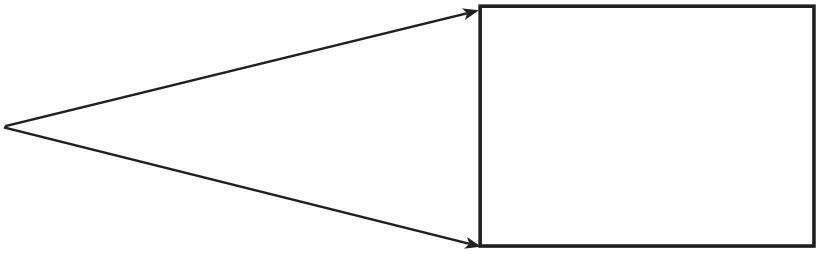
10 Based on the values you recorded in Steps 8 and 9, calculate the average length of <u>one</u> onion cell in your diagram to the nearest 0.1 mm. _____ mm/cell

Work Space

11 Return Slide B.

12 Place Slide C on the microscope stage. Bring Slide C into focus under the lowest power. Now bring the slide into focus under the highest power. In the box below, draw an enlarged view of one typical cell on this slide under the highest power. Your drawing should accurately show the shape and structures of the cell.

(Draw in the box below)



Field of View

Enlarged View of One Cell Under Highest Power

13 When you are finished, put the microscope back to the lowest power. Return all materials to their positions as shown on the Station Diagram.

STOP

New York State
Intermediate-Level Science Test Sampler
Rating Guide for Part D, Sample Performance Test

This rating guide contains detailed directions for rating the students' test booklets; ratings of sample student answers are also given. All raters should become familiar with the detailed directions before beginning to rate students' answers.

In rating the students' answers, follow the procedure outlined below:

1. Have the test booklets and directions for administering the performance test sampler on hand.

2. Carefully review each station, the criteria for rating, and the sample student answers.You may wish to have a set of stations available to check the accuracy of questionable student answers by actually performing the task for which the answer was given.

3. Make sure you have the completed copy of the Test Administrator's Record Sheet (the last page of the Directions for Administering the Performance Test booklet) for the set of test booklets you are rating. This sheet **must** be completed to ensure correct rating.

4. Meet with the other raters to discuss the tasks and criteria. (It would be helpful to use a set of student test booklets as a training exercise in this meeting.) When you clearly understand the tasks and the rating criteria, you are ready to begin to rate the students' test booklets.

5. It is recommended that you rate all the students' responses for one station before proceeding to the next station. This helps ensure that the rating criteria are applied consistently.

6. Read each student's answers quickly, keeping in mind the task and the rating criteria. Do not spend time agonizing over a student's answer. However, do not read the answers superficially; some answers may require a second reading to determine the appropriate rating. **The student should not lose credit for incorrect grammar, spelling, capitalization, or punctuation.**

7. Record the number of credits given for each task in the right margin of each student's test booklet.

8. Add the scores for the tasks at each station to get a total score for the station.

9. Record the student's scores for each station and total performance test score in the appropriate spaces on the cover page of the student's test booklet.

The samples of acceptable answers provided in this rating guide are not the only possible correct answers. Other answers that convey the same general meaning as those given in this guide should also receive credit. You may find it helpful to discuss questionable student answers with other raters.

Guide to Rating Station X: Experimenting with a Ball and Ramp

Maximum Number of Credits: 10

1–2 Directions **0 credits**

3–7 Gathering and recording data **6 credits**

Criteria:

• Allow 1 credit if the student's data table contains a distance recorded in each of the five designated cells.

• Allow 1 credit if all values are recorded to the nearest 0.1 cm.

The distances recorded in the table show a general pattern of increase over the first three trials (from 15- to 25-cm release points):

• Allow 2 credits for an increasing pattern in all three values.
• Allow 1 credit for an increasing pattern in two of the three values.
• Allow 0 credits for no pattern or a decreasing pattern.

• Allow 1 credit if two of the three 25-cm trials recorded on the data table are different.

• Allow 1 credit if the range of the three 25-cm trials is not more than 4 cm.

8 Explanation for differences in 25-cm trials **2 credits**

Criteria:

The student provides two different scientifically accurate explanations for why the cup does not stop at the exact same point each time it is released from the 25-cm mark on the ruler. The student should not lose credit for incorrect grammar, spelling, capitalization, or punctuation. (1 credit each)

(NOTES: If more than two explanations are given, score only the first two.
As the place mat is used a number of times, the surface may become smoother, so the cup's sliding distance may increase over time.)

Sample 1-credit responses:

— I released it from slightly different points each time.
— A slight wind may have pushed the ball.
— The table might have shook when the ball was dropped.
— The cup may not have been at exactly the same place each time.
— The speed of the ball was different at some times.
— There might have been a slight push when I released the ball.
— The ball may not have been exactly at the 25-cm mark every time.
— It might have happened because of inaccurate measuring with the ruler.
— I think the mat becomes smoother each time.

Sample <u>incorrect</u> responses:

— The golf ball weighed less.
— The ball was held longer sometimes.
— Other responses related to control variables—slope of the ramp, mass of the cup, numbers on the ruler or place mat.

9 Think about using cups of different masses **0 credits**

10 Recommendation for release point and explanation **1 credit**

Criteria:

The student correctly states or implies that the release point should be the same for all of the cups. The student should not lose credit for incorrect grammar, spelling, capitalization, or punctuation. (1 credit)

Sample 1-credit responses:

— I would recommend a release point of 17 cm for all four cups so that the mass of the cup is the only variable.
— I think that the release point should be at 15 cm for each cup.
— I would start at the same distance on the ruler each time. This way you can get an exact measurement.

Sample incorrect responses:

— I would recommend the release point to be sturdy because it could bend more one time than another.
— I recommend that the release point should be higher for the cups that weigh more.
— I would recommend that the distance be doubled each time a new cup is added, to keep it proportional to the original test.

11 Hypothesis **1 credit**

Criteria:

The hypothesis relates the variables (weight/mass) of the cup and distance moved. The student should not lose credit for incorrect grammar, spelling, capitalization, or punctuation. (1 credit)

Sample 1-credit responses:

— If the ball is released from the same point each time, the cup with the least mass will travel the farthest and the cup with the greatest mass will travel the least.
— The golf ball will move the lighter cups a longer distance than the heavier cups.
— The smaller mass the cup has, the farther it will go.
— Cups of different masses will move different distances.
— The lighter cups will move farther than the heavier ones.

Sample incorrect responses:

— The bigger the slope, the more the cup moves. If the ball starts at a higher centimeter, it will move a cup more.
— The higher the mass, the harder it will be for the golf ball to move.

12 Return all materials to their positions as shown on the Station Diagram **0 credits**

Guide to Rating Station Y: Soaps and Water

Maximum Number of Credits: 18

1 Directions **0 credits**

2 Record numbers for Soap A and Soap B **0 credits**

(NOTE: These numbers should be the same and should correspond to the group number on the cover of the student's test booklet. The rater will need to refer to the Test Administrator's Record Sheet to determine the correct range of values for each soap sample.)

3 Directions **0 credits**

4 Measure and record mass of Soap A and Soap B **3 credits**

Criteria:

(NOTE: The masses of the individual samples of Soap A are not all the same. Likewise, the masses of the individual samples of Soap B are not all the same. Prior to the test administration, the teacher should have determined the masses of Soap A and Soap B for each group of stations in the classroom, using the balance at that station. This information should be recorded on the Test Administrator's Record Sheet. Check the student's response to #2 to see which soap samples were used. Consult the Test Administrator's Record Sheet to determine the correct range of mass values for the soap group that the student used and evaluate the student's responses accordingly. For ease of scoring, the correct values can be noted on the student's answer booklet.)

• Allow 1 credit if the student correctly measures the mass of Soap A as _____ g (± 1.0 g).

• Allow 1 credit if the student correctly measures the mass of Soap B as _____ g (± 1.0 g).

• Allow 1 credit if the student's value for either Soap A or Soap B is recorded in the data table to the nearest 0.1g.

5 Calculate and record the volume of Soap A **4 credits**

Criteria:

• Allow 1 credit if the student's work space shows two or more correct dimensions. Refer to the Test Administrator's Record Sheet for the acceptable ranges. (NOTE: It does not matter which value is assigned to length, width, and height, as long as the values are correct.)

For example: Length 7.5 ± 0.2 cm = 7.3–7.7 cm
Width 5.0 ± 0.2 cm = 4.8–5.2 cm
Height 2.5 ± 0.2 cm = 2.3–2.7 cm

• Allow 1 credit if the student correctly substitutes his/her three values into the formula to determine the volume of Soap A.

• Allow 1 credit if the student correctly calculates the volume of Soap A based on the values that the student has substituted into the formula.

For example: Based on the dimensions above, the correct volume is 93.75, rounded to 93.8; range is 80.6–108.1 cm^3.

• Allow 1 credit if the student's value for the volume of Soap A is recorded in the data table to the nearest 0.1 cm^3.

(NOTE: If the answer in the work space is correct but disagrees with the answer in the data table, it is permissible to score the work space answer. If this is the case, circle the scored value in the work space.)

6 Calculate and record the density of Soap A **3 credits**

Criteria:

The student correctly calculates the density of Soap A, using data from the table. (NOTE: Evaluate the student's response based on the values for Soap A in the student's data table or work space, even if the values are incorrect.)

• Allow 1 credit if the student correctly substitutes her/his values in the formula to determine the density of Soap A.

• Allow 1 credit if the student correctly calculates the density of Soap A based on the values the student has substituted in the formula.

• Allow 1 credit if the student's value for the density of Soap A is recorded in the data table to the nearest 0.1 g/cm^3.

(NOTE: If the answer in the work space is correct but disagrees with the answer in the data table, it is permissible to score the work space answer. If this is the case, circle the scored value in the work space.)

7 Calculate and record the volume of Soap B **3 credits**

Criteria:

The student correctly calculates the volume of Soap B, given the mass and density. (NOTE: Evaluate the student's response based on the values for Soap B in the student's data table or work space, even if the values are incorrect.)

• Allow 1 credit if the student correctly substitutes her/his values in the formula to determine the volume of Soap B.

• Allow 1 credit if the student correctly calculates the volume of Soap B, using the values the student has substituted in the formula.

• Allow 1 credit if the student's value for the volume of Soap B should be recorded in the data table to the nearest 0.1 cm^3.

(NOTE: If the answer in the work space is correct but disagrees with the answer in the data table, it is permissible to score the work space answer. If this is the case, circle the scored value in the work space.)

8 Think about Soap A and Soap B being placed in water **0 credits**

9 Position Soap A would have in water **1 credit**

Criteria:

(NOTE: This prediction will need to be checked against the student's data table. There will be more than one "correct" answer here if earlier errors are carried forward.)

The student circles the block that correctly reflects the density of Soap A as shown in the student's data table or work space. (1 credit)

If the student-determined density is > 1.0, the student should circle Block 1.
If the student-determined density is = 1.0, the student should circle Block 2.
If the student-determined density is < 1.0, the student should circle Block 3 or Block 4.

10 Position Soap B would have in water **2 credits**

Criteria:

The student circles the block that correctly reflects where Soap B would be if it were placed in the container of water. (NOTE: The density value of 0.8 gm/cm^3 was provided in the data table.)

• Allow 2 credits if the student circles Block 3.

• Allow 1 credit if the student circles Block 4 or both Blocks 3 and 4.

• Allow 0 credits if the student circles Block 1 or Block 2.

11 Compare the density of the rubber and Styrofoam balls **2 credits**

Criteria:

• Allow 1 credit if the student correctly states that the rubber ball is more dense than the Styrofoam ball OR that the Styrofoam ball is less dense than the rubber ball. The student should not lose credit for incorrect grammar, spelling, capitalization, or punctuation.

• Allow 1 credit if the student supports her/his statement with accurate observations.

Sample 2-credit responses:

— The rubber ball must be denser than the Styrofoam ball because it sinks lower in the water.

— The density of the rubber ball is more than the Styrofoam ball because the rubber ball is almost completely underwater while the Styrofoam ball is floating on top of the water.

Sample 1-credit responses:

— The rubber ball is denser than the Styrofoam ball. (Student does not explain answer.)

— The rubber ball is heavier, so it sinks more. The Styrofoam ball was so light that it floated on the top. (Student explains answer, but addresses weight rather than density.)

Sample <u>incorrect</u> responses:

— Because the rubber ball is heavier.

— The Styrofoam ball stays on the top and the rubber ball is in the water half and half.

12 Return the balls to the plastic bag **0 credits**

13 Return all materials to their positions as shown on the Station Diagram **0 credits**

Guide to Rating Station Z: Cell Size

Maximum Number of Credits: 12

1 Examine Slide A **0 credits**

2 Description of Slide A **0 credits**

3 Bring graph paper on Slide A into focus **0 credits**

4 Estimate the diameter of the field of view **2 credits**

Criteria:

The student estimates the diameter of the field of view with precision. (NOTE: Teacher must check the fields on the microscopes in the testing room to be sure that they are all about 1.5 mm [about 1.5 squares] for a 100x magnification.)

• Allow 2 credits if the student estimates the diameter of the field of view in the range 1.25–1.75 mm.

• Allow 1 credit if the student estimates the diameter of the field of view either in the range 1.00–1.24 mm or in the range 1.76–2.0 mm.

• Allow 0 credits if the student estimates the diameter of the field of view either as less than 1.00 mm or as more than 2.0 mm.

5 Return Slide A **0 credits**

6 Description of onion skin tissue slide **0 credits**

7 Draw one row of onion skin cells **3 credits**

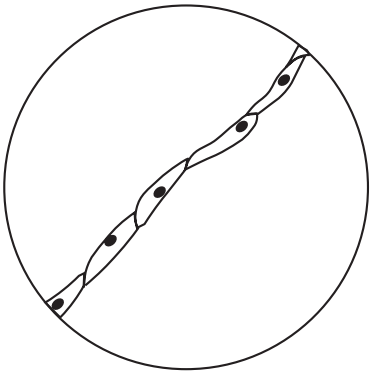
Criteria:

• Allow 1 credit if the student's diagram of the onion skin cells includes cells in at least one connected row across the field of view. (NOTE: Do not penalize if additional cells are shown.)

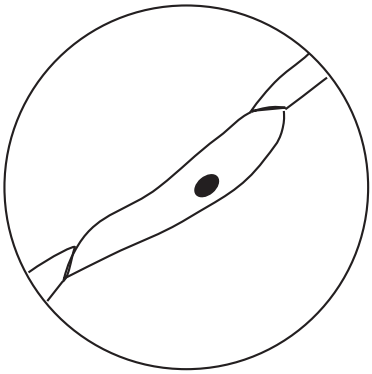
• Allow 1 credit if the student's diagram contains 4–7 cells in a row.

• Allow 1 credit if the student's diagram approximates the general shape illustrated below. (NOTE: The nucleus need not be included.)

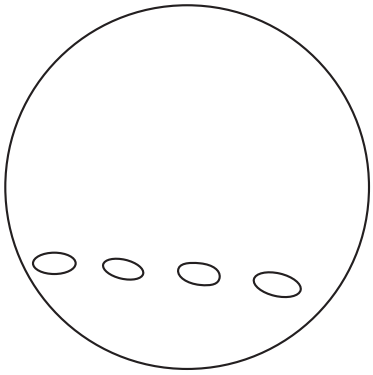
Sample 3 – credit response:



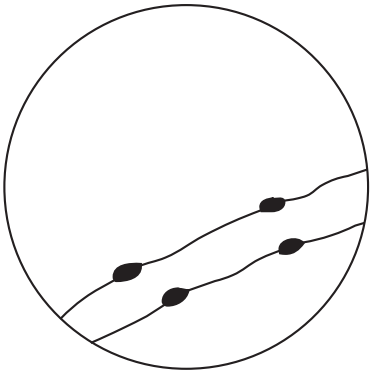
Sample 2 – credit response:



Sample 1 – credit response:



Sample incorrect response:



8 How many cells are in a row? **1 credit**

Criteria:

The student's response matches the number of cells in the student's diagram (±1 cell).

(NOTE: Evaluate the student's response based on the student's diagram in #7.)

9 Record the field of view value determined in #4 **0 credits**

10 Calculate the length of one onion skin cell **3 credits**

Criteria:

The student shows work that indicates a correct approach to the problem and obtains a solution by dividing the value in #9 by the value in #8. (NOTE: Evaluate the student's response based on the student's data in #8 and #9.)

• Allow 2 credits if the student shows a correct approach and arrives at a correct answer.

• Allow 1 credit if the student shows a correct approach and arrives at an incorrect answer.

OR

• Allow 1 credit if the student arrives at a correct answer but does not show work.

• Allow 0 credits if the student shows an incorrect approach regardless of the answer provided.

• Allow 1 credit if the student expresses the answer to the nearest 0.1 mm.

Sample correct approaches:

mm/cells = 1.5 mm/ 5 cells = 0.3 mm/cell

5 cells/ 1.5 mm = 1 cell/ X mm
5X = 1.5
X = 0.3 mm

11 Return Slide B **0 credits**

12 Diagram of enlarged view of one cell on Slide C **3 credits**

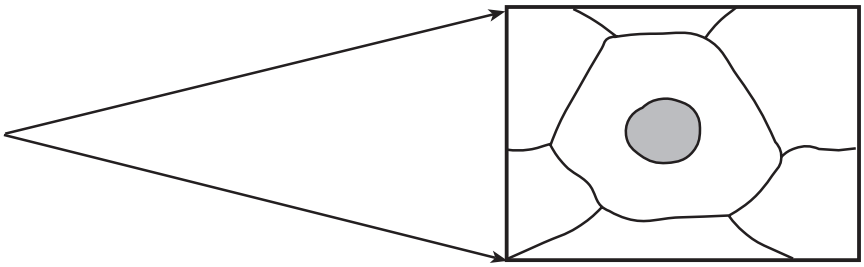
Criteria:

The student accurately diagrams one cell as it appears on the slide, using an enlarged view. (The periphery of adjacent cells may be included.) (NOTE: No credit should be given if the diagram contains more than one cell.)

• Allow 1 credit if the diagram shows an accurate cell shape consistent with the slide.
• Allow 1 credit if the diagram shows the cell nucleus.
• Allow 1 credit if the nucleus is shown in correct relative size to the cell.

NOTE: The diagrams shown as samples on the following pages are for <u>frog skin</u>. Other specimens may be used. If this is the case, schools will need to develop the sample diagrams to match the specimens used.

Sample 3 –credit response:

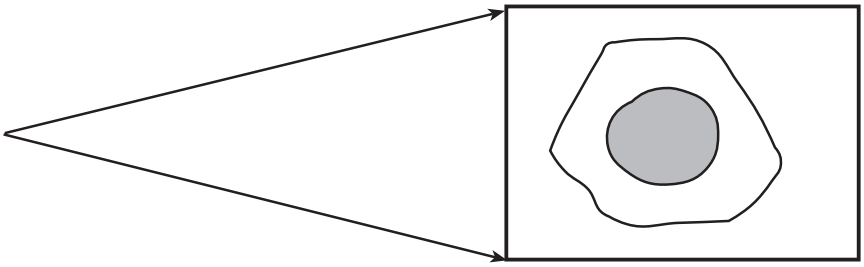


Field of View

Enlarged View of One Cell Under Highest Power

Rationale: one cell has accurate shape; shows nucleus in correct relative size to the cell

Sample 2 –credit response:

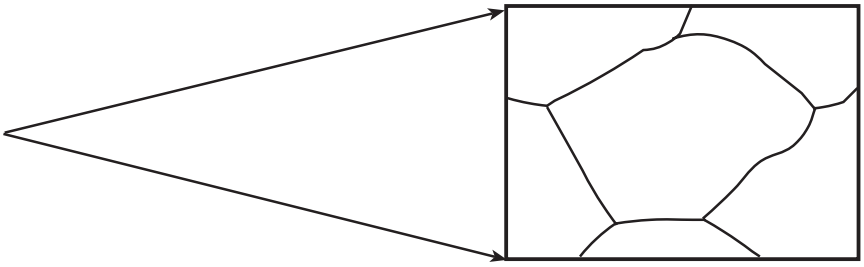


Field of View

Enlarged View of One Cell Under Highest Power

Rationale: one cell has accurate shape; shows nucleus; but nucleus is larger than it should be

Sample 1 –credit response:

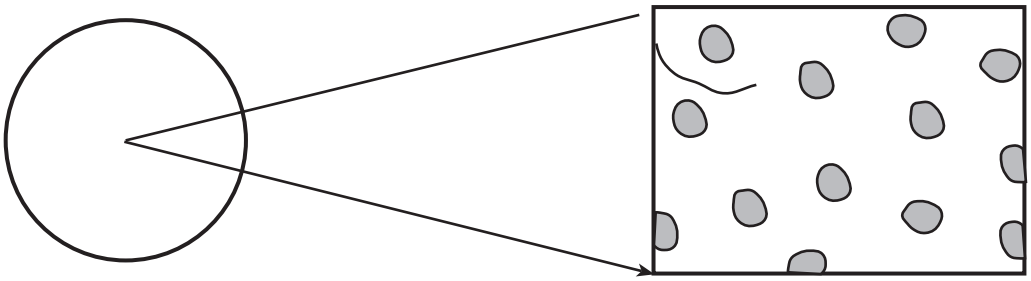


Field of View

Enlarged View of One Cell Under Highest Power

Rationale: one cell; accurate shape; no nucleus; no relative size

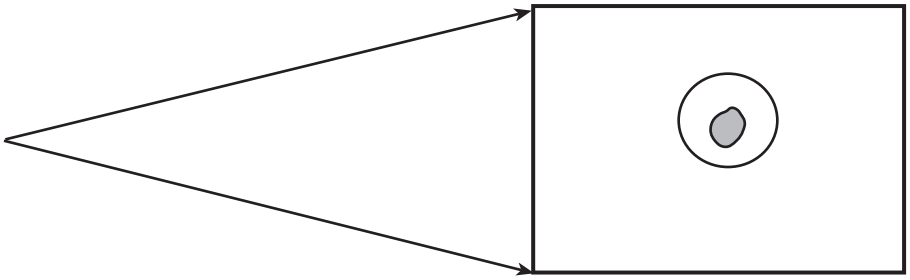
Sample incorrect responses:



Field of View

Enlarged View of One Cell
Under Highest Power

Rationale: more than one cell,
student used low power



Field of View

Enlarged View of One Cell
Under Highest Power

Rationale: cell too small
(used low power)

13 Return all materials to their positions as shown on the Station Diagram **0 credits**

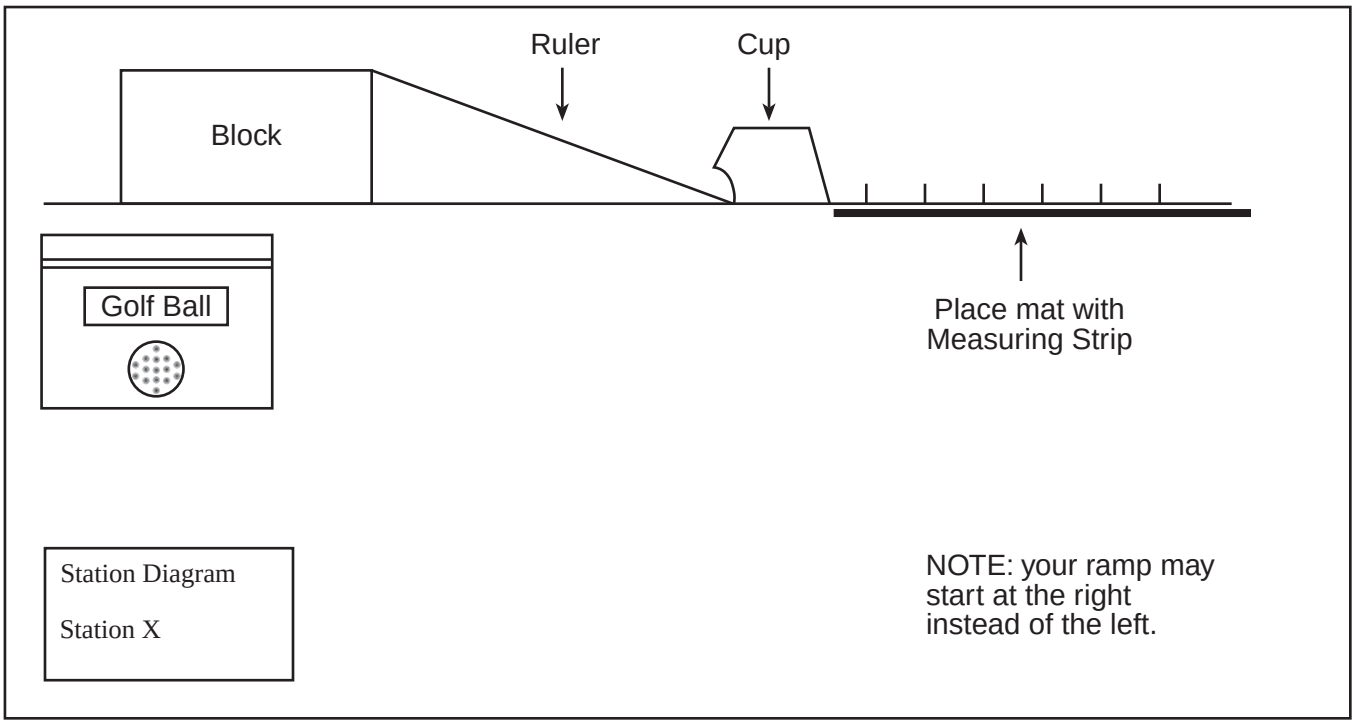
Appendix A

Master Copies and Templates for Part D, Sample Performance Test

Single-sided copy of the materials listed below is provided in this appendix. They can be reproduced as needed when administering the performance test sampler.

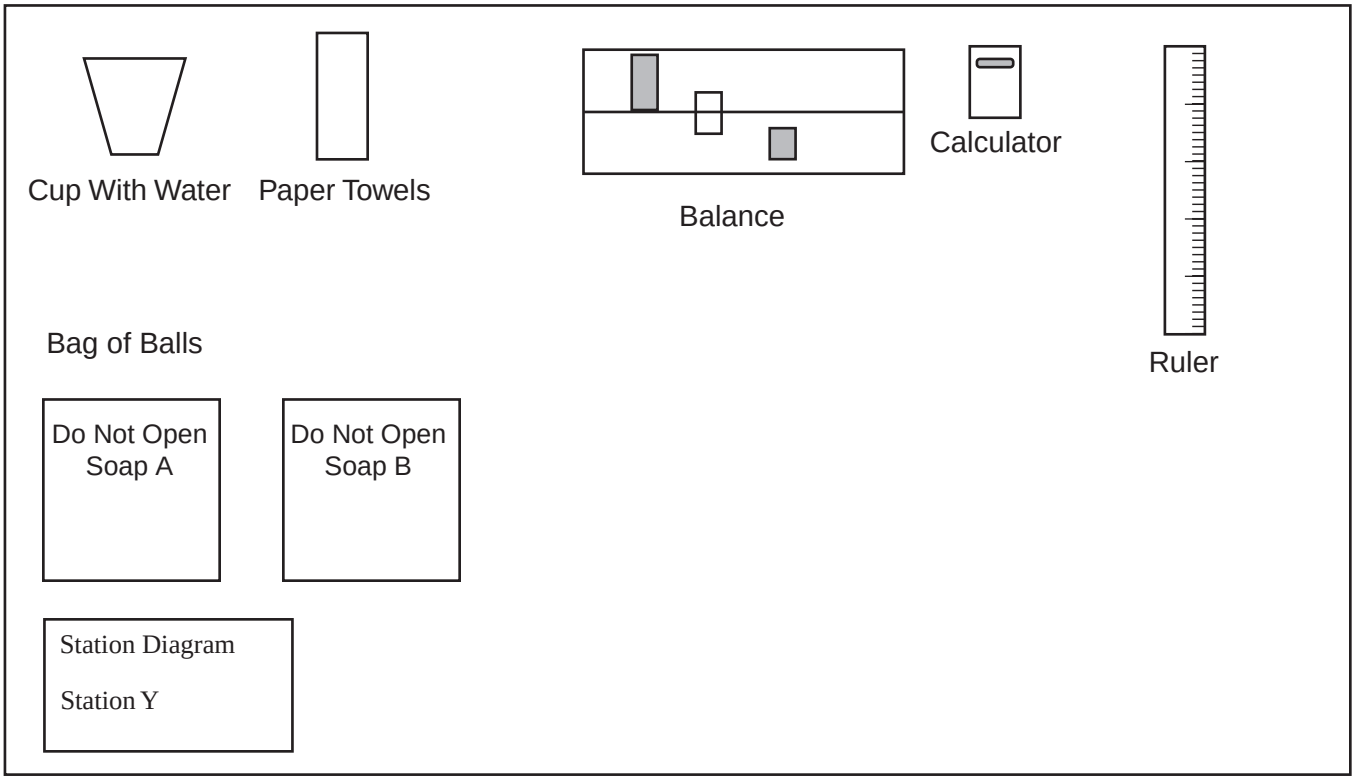
- Master copies of Station Diagrams
- Template for Station X
- Test Administrator's Record Sheet

Station Diagram
Station X: Experimenting with a Ball and Ramp



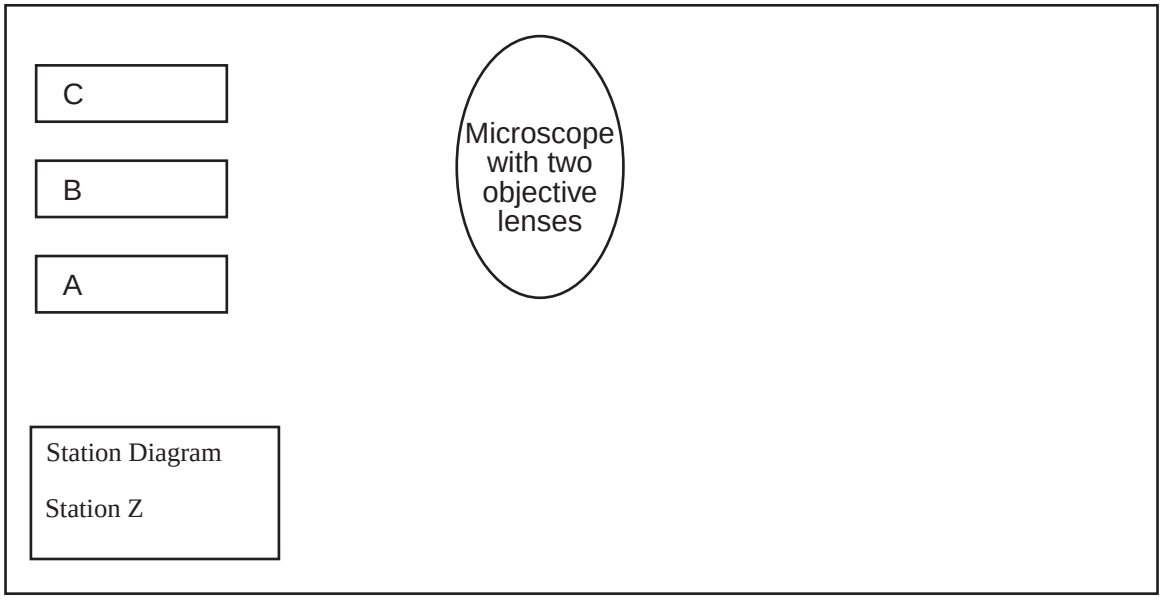
Fold Along Line

Station Diagram
Station Y: Soaps and Water



Fold Along Line

Station Diagram
Station Z: Cell Size



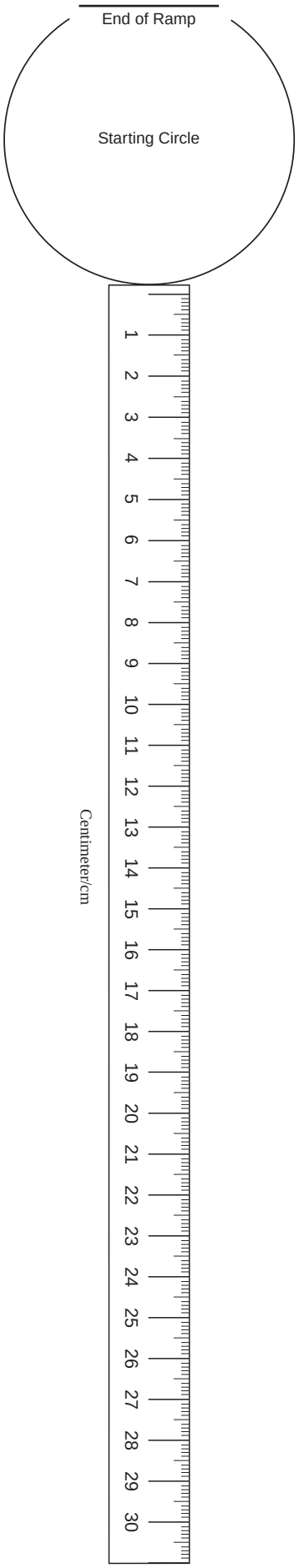
Fold Along Line

Station X – Ramp Place Mat

The place mat for this station should be reproduced on 11" x 17" paper and laminated.

Ramp Place mat

for actual size-
increase to 155%
and print on
11" x 17" paper



New York State
Intermediate-Level Science Test, Part D
Performance Test Sampler (Stations X, Y, and Z)
Test Administrator's Record Sheet

This record sheet should be completed by the person(s) administering the performance test sampler. At the conclusion of the test administration, this completed record sheet will be used when the students' test booklets are rated.

Test Administrator(s): _____ Date: _____

School Name:_____ School District: _____

Station X: Soaps and Water

Soap A Masses

Group	Mass (to the nearest 0.1 g)	Acceptable Range (±1.0 g)
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		

Soap B Masses

Group	Mass (to the nearest 0.1 g)	Acceptable Range (±1.0 g)
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		

Soap A Measurements

Length _____ ±0.2 cm Width _____ ±0.2 cm Height _____ ±0.2 cm Volume _____ ±14 cm^3

NOTE: If any materials used during the test administration were different from those specified in the test manual or if the administration directions were not followed exactly as written, list the differences below. Use the reverse side of this page if you need additional space. This information may be needed when rating the students' responses.

Appendix B

The chart in this appendix references each item in this test sampler draft to the "Intermediate Level Science Core Curriculum." When an item measures more than one key idea, the item number will appear in more than one place.

New York State
Intermediate-Level Science Examination - Test Sampler Draft
Reference to "Intermediate Level Science Core Curriculum" (This core curriculum is based on the New York State *Learning Standards for Mathematics, Science, and Technology)*

Standard/Area	Key Ideas	Objective Test Sampler Item #	Performance Test Sampler Item #		
			Station X	Station Y	Station Z
Standard 1 **Scientific Inquiry** **Key Idea 1** The central purpose of scientific inquiry is to develop explanations of natural phenomena in a continuing, creative process.	**1.1** Formulate questions independently with the aid of references appropriate for guiding the search for explanations of everyday observations.				
	1.2 Construct explanations independently for natural phenomena, especially by proposing preliminary visual models of phenomena.	43 44 45	9	11	7 12
	1.3 Represent, present, and defend their proposed explanations of everyday observations so that they can be understood and assessed by others.		8 11	9 10 11	8 12
	1.4 Seek to clarify, to assess critically, and to reconcile with their own thinking the ideas presented by others, including peers, teachers, authors, and scientists.			8	
Standard 1 **Scientific Inquiry** **Key Idea 2** Beyond the use of reasoning and consensus, scientific inquiry involves the testing of proposed explanations involving the use of conventional techniques and procedures and usually requiring considerable ingenuity.	**2.1** Use conventional techniques and those of their own design to make further observations and refine their explanations, guided by a need for more information.		3, 4, 5, 6, 7	4, 5, 6, 7, 11	1, 2, 3, 4, 6, 8, 10, 12
	2.2 Develop, present, and defend formal research proposals for testing their own explanations of common phenomena, including ways of obtaining needed observations and ways of conducting simple controlled experiments.	39	10		
	2.3 Carry out their research proposals, recording observations and measurements (e.g., lab notes, audiotape, computer disk, videotape) to help assess the explanation.		3, 4, 5, 6, 7	4, 5, 6, 7	10, 12
Standard 1 **Scientific Inquiry** **Key Idea 3** The observations made while testing proposed explanations, when analyzed using conventional and invented methods, provide new insights into phenomena.	**3.1** Design charts, tables, graphs and other representations of observations in conventional and creative ways to help them address their research question or hypothesis.	40			7
	3.2 Interpret the organized data to answer the research question or hypothesis and to gain insight into the problem.	21, 22, 23, 24, 42	8, 10, 11	8, 9, 10	10
	3.3 Modify their personal understanding of phenomena based on evaluation of their hypothesis.		11		

New York State
Intermediate-Level Science Examination - Test Sampler Draft
Reference to "Intermediate Level Science Core Curriculum" (This core curriculum is based on the New York State *Learning Standards for Mathematics, Science, and Technology)*

Standard/Area	Key Ideas	Objective Test Sampler Item #	Performance Test Sampler Item #		
			Station X	Station Y	Station Z
Standard 1 **Mathematical Analysis**	**1** Abstraction and symbolic representation are used to communicate mathematically.		11	5, 6, 7	
	2 Deductive and inductive reasoning are used to reach mathematical conclusions.		9, 10	8, 9, 10, 11	
	3 Critical thinking skills are used in the solution of mathematical problems.		10		4, 10
Standard 1 **Engineering Design**	**1** Engineering design is an iterative process involving modeling and optimization (finding the best solution within given constraints); this process is used to develop technological solutions to problems within given constraints.		9, 10		
Standard 2 **Information Systems**	**1** Information technology is used to retrieve, process, and communicate information as a tool to enhance learning.				
	2 Knowledge of the impacts and limitations of information systems is essential to its effectiveness and ethical use.				
	3 Information technology can have positive and negative impacts on society, depending upon how it is used.				
Standard 6 **Systems Thinking**	**1** Through systems thinking, people can recognize the commonalities that exist among all systems and how parts of a system interrelate and combine to perform specific functions.		8, 9, 10, 11		
Standard 6 **Models**	**2** Models are simplified representations of objects, structures, or systems used in analysis, explanation, interpretation, or design.		9, 10, 11	8, 9, 10	4, 6, 7, 8, 10, 12
Standard 6 **Magnitude and Scale**	**3** The grouping of magnitudes of size, time, frequency, and pressures or other units of measurement into a series of relative order provides a useful way to deal with the immense range and the changes in scale that affect the behavior and design of systems.				4, 6, 7, 8, 10, 12
Standard 6 **Equilibrium and Stability**	**4** Equilibrium is a state of stability due either to a lack of change (static equilibrium) or a balance between opposing forces (dynamic equilibrium).			8, 9, 10	

New York State
Intermediate-Level Science Examination - Test Sampler Draft
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Standard/Area	Key Ideas	Objective Test Sampler Item #	Performance Test Sampler Item #		
			Station X	Station Y	Station Z
Standard 6 Patterns of Change	**5** Identifying patterns of change is necessary for making predictions about future behavior and conditions.		9, 10, 11		
Standard 6 Optimization	**6** In order to arrive at the best solution that meets criteria within constraints, it is often necessary to make trade-offs.				
Standard 7 Interdisciplinary Problem Solving	**1** The knowledge and skills of mathematics, science, and technology are used together to make informed decisions and solve problems, especially those relating to issues of science/technology/society, consumer decision making, design, and inquiry into phenomena.	39	3, 4, 5, 6, 7, 9, 10	11	4, 7, 8, 12
	2 Solving interdisciplinary problems involves a variety of skills and strategies, including effective work habits; gathering and processing information; generating and analyzing ideas; realizing ideas; making connections among the common themes of mathematics, science, and technology; and presenting results.				

New York State
Intermediate-Level Science Examination - Test Sampler Draft
Reference to "Intermediate Level Science Core Curriculum" (This core curriculum is based on the New York State *Learning Standards for Mathematics, Science, and Technology)*

Standard/Area	Key Ideas	Objective Test Sampler Item #	Performance Test Sampler Item #		
			Station X	Station Y	Station Z
Standard 4 **Living Environment**	**1** Living things are both similar to and different from each other and from nonliving things.	1, 2			Station Z
	2 Organisms inherit genetic information in a variety of ways that result in continuity of structure and function between parents and offspring.	3, 25, 26, 27			
	3 Individual organisms and species change over time.	4			
	4 The continuity of life is sustained through reproduction and development.	5, 6, 33, 34			
	5 Organisms maintain a dynamic equilibrium that sustains life.	7, 8, 28, 29, 30, 31			
	6 Plants and animals depend on each other and their physical environment.	28, 29, 30, 31, 32			
	7 Human decisions and activities have had a profound impact on the physical and living environment.	41, 42			
Standard 4 **Physical Setting**	**1** Earth and celestial phenomena can be described by principles of relative motion and perspective.	9, 18			
	2 Many of the phenomena that we observe on Earth involve interactions among components of air, water, and land.	10, 11, 12, 43, 44, 45			
	3 Matter is made up of particles whose properties determine the observable characteristics of matter and its reactivity.	13, 14, 15, 19, 35, 36		Station Y	
	4 Energy exists in many forms, and when these forms change energy is conserved.	15, 16, 20, 37, 38			
	5 Energy and matter interact through forces that result in changes in motion.	17, 21	Station X		

New York State Education Department, Room 674 EBA, Albany, NY 12234

Intermediate-Level Science Examination
Test Sampler Draft, Spring 2000
Comment Sheet

Please circle "Yes" or "No" and share your comments for each question below.

1. **Content**—Are the questions generally appropriate in content? YES No
   Comments:

2. **Difficulty**—Are the questions generally appropriate in difficulty? YES No
   Comments:

3. **Directions**—Are the directions in the Test Sampler Draft clear and easy for students to follow? YES No
   Comments:

4. **Scoring Guidelines**—Are the Scoring Guidelines for Parts B and C clear and easy for teachers to follow? YES No
   Comments:

5. **Rating Guide:** Is the Rating Guide for Part D clear and easy to follow? YES No
   Comments:

6. **Additional Comments:**

Please fax this sheet to (518) 473-0858 or mail it to the New York State Education Department at the above address.